



# Participation of Women in Environmental Protection, Conservation and Management in Voi Sub-County, Taita Taveta County, Kenya

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**Abstract:** Worldwide, women have made a substantial contribution to environmental protection initiatives. Yet they have been underrepresented in environmental decision-making processes. Voi sub-County experiences the devastating effects of deforestation and land degradation. This study explored the participation of women in environmental protection, conservation, and management in the Voi sub-County, Taita Taveta County. Ecofeminist and participation theories guided the research and adopted mixed methods sequential explanatory design. The study targeted a population of 8631 women in Mbololo and Ngolia wards, in Voi sub-County. A sample size of 400 participants was selected using proportionate random sampling and determined using a Yamane formula. Data was collected through primary and secondary methods. The primary data collection instruments included; questionnaires, in-depth interviews, and Focus Group Discussions and secondary data collected through a comprehensive review of the literature. Quantitative data was analysed through descriptive and inferential statistics using SPSS version 27. Qualitative data were categorized into themes and sub-themes. The findings indicate that only a small proportion of women are involved in environmental conservation initiatives. Women have not been empowered with environmental management skills. The study recommends creating awareness of environmental issues, and involvement of women in training programmes.

**Keywords:** Women, Participation, Environment, Protection, Conservation, Management, Initiatives, Natural Resources

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## 1. Introduction

The growing human population and rapid technological advancements are straining the Earth's ecosystems and natural resources (Subramanian, 2018). Over-exploitation of resources has led to their deterioration and depletion due to industrial pollution, deforestation, and urbanization. To protect and enhance natural resources and the environment, it is crucial to take action. Women, especially in rural areas, have direct interaction with natural resources and utilize them for their families basic

needs (Singh & Singh, 2017). Over time, women have become advocates for environmental preservation and play a significant role in managing natural resources at the household and community levels (Segerson, Kling & Bockstael, 2022). The importance of including women in environmental decision-making processes has been emphasized in the literature since the 1980s. However, despite efforts to address the inclusion of women, challenges remain regarding when and how to incorporate them effectively. The role of gender cannot be disregarded in the management of forest resources (Sengupta, 2021). Active participation from both men and

women in environmental decision-making processes is essential for the effective protection, conservation, and sustainable management of the environment and natural resources.

Globally, women have historically been marginalized and underrepresented in environmental decision-making processes. In the United States of America (USA), Winona LaDuke serves as the executive director of Honour the Earth, a local environmental advocacy organization, and she founded the White Earth Land Recovery Project in her community (Siedlecki, 2020). In Brazil, Marina Silva, a prominent advocate for the Amazon Rainforest, worked alongside Chico Mendes, who was tragically assassinated while defending the rainforest in 1988 (Shanley et al., 2018). Silva and Mendes jointly led demonstrations in the 1980s to safeguard the rainforest from government control (Raimi, 2019). Sweden has a longstanding political culture that places a high value on environmental protection. Women in Sweden, like those in some other industrialised countries, have been empowered by government policies and regulations to play an active role in preserving the environment. In Sweden, women comprise 64% of local government workers, and 45% of the Swedish parliament consists of women since the 2010 election (Borchorst & Siim, 2018). The government has acknowledged that women are disproportionately affected by climate change and environmental degradation (Barth & Melin, 2018), and has pledged to enhance women's participation in decisions and policy discussions about climate change and other environmental concerns due to this recognition.

Regionally, Africa is facing critical environmental challenges such as land degradation, deforestation, biodiversity loss, and susceptibility to the consequences of climate change (Steiner, 2019). However, Azeiteiro et al. (2021) point out that, Africa, which is home to approximately fifteen per cent of the world's population, as well as some of its iconic species, has a potential for sustainable growth and environmental conservation. Olalekan et al. (2019) highlight that women in Africa actively engage in conservation activities and environmental management. However, they are often marginalized as partners in addressing environmental issues, lacking the recognition and attention they rightfully deserve. Furthermore, as noted by Parpart (2019), the social and economic activities of women in Africa depend on environmental resources such as land, forest, water, and fodders. In sub-Saharan Africa and the Caribbean, women play a crucial role in producing 80% of basic foodstuffs, while in Asia, they contribute to fifty to ninety per cent of the labour force for rice cultivation. In Nigeria, specifically in Adamawa state, 60% of women are engaged in farming. Additionally, women in Imo state, the Gurei district of Adamawa state, and many other

parts of the country have been reported to contribute significantly to food production, even undertaking traditional male agricultural tasks (Kim, Bansal & Haugh, H. 2019). Moreover, Yanquoi, Hiama and Jones (2018) point out that women in Liberia and Sierra Leone enrich the soil through their daily activities, such as cooking and cleaning, by adding organic matter such as ash, potash, and leftover food and stalks to form African Dark Earth. This practice is based solely on traditional knowledge and is believed to improve soil quality.

In Kenya, Ondiba and Matsui (2021) point out that women interact extensively with the physical environment in their daily activities. They interact with the environment as they cultivate their fields, search for fuel wood, fetch water, forage for subsistence food, and maintain their homes, which results in more frequent interactions with the environment compared to men. In 1977, Professor Wangari Maathai founded the Kenyan Green Belt Movement (GBM), which placed a strong emphasis on the value of women's voices and perspectives in environmental preservation. The foundation has planted over 51 million trees in Kenya (Ochieng, 2017). Djurfeldt (2020) indicates that in Kenya, there are social norms that prevent women from inheriting land. Although women have the legal right to inherit the land according to the 2010 Constitution, cultural beliefs and practices often forbid or make it rare for women to inherit land in reality. Over the period spanning from 2001 to 2021, Taita Taveta experienced a significant loss of 847 hectares of relative tree cover, signifying a complete decline of 100% since the year 2000. This loss corresponds to approximately 0.23% of the total global tree cover. During the period from 2013 to 2021, all of the tree cover loss in Taita Taveta took place exclusively within the natural forest, accounting for a complete loss of tree cover within this specific area (USAID, 2021).

## 1.1 Statement of the Problem

Wekesa et al. (2020) report that between 1973 and 1987, Taita Taveta County lost the largest forest area among its five components. Chawia lost 33.0%, Fururu 8.7%, Mbololo 13.2%, Ngangao 10.5%, and Vuria 31.6%. The tragedy of the commons thesis holds that greedy people who use a shared resource degrade it (Mildenberger, 2019). Hence, deforestation and land degradation in Taita Taveta County are causing wildlife habitat loss, which increases human-wildlife conflict in settlements and livestock-wildlife conflict.

Women are the main environmental stakeholders internationally, regionally, locally, and in Voi sub-County, Taita Taveta County (Athman, 2020). Women are the key stakeholders of natural resources in Kenya, which has 23,548,056 men and 24,014,716 women

(KNBS, 2019). They manage land, water, woods, and energy and have deep traditional and modern knowledge of the natural world (USAID, 2021). Women of Voi sub-County, Taita Taveta County are concerned about climate change, prolonged drought, landslides, and changing rain patterns caused by forest destruction and land degradation, which has resulted in deforestation, agricultural activities, human settlements, charcoal production, grazing, road, bridge, and SGR construction (Mwikamba, Otieno & Kosura, 2022). Deforestation and environmental degradation create drought, food shortages, desertification, floods, infrastructure devastation, massive gullies, and malaria-causing mosquitoes (Icheria, 2019).

Deforestation and land degradation continue to be felt in Voi sub-County. In Tsavo National Park, habitat degradation has disrupted wildlife viewing points (Aveni, 2018). Heavy rainfall destroys roads, and buildings, and causes soil erosion and floods. Increasing water runoff creates massive gullies that destroy roads, landslides, and structures. Accident-causing gullies endanger drivers. The County is food insecure due to crop and livestock output declines (Abera et al., 2022). If desertification, deforestation, and afforestation are not stopped, food security, floods, starvation, malnutrition, and diseases like malaria will put the county in a catastrophic state. Charcoal overuse and deforestation-related air pollution increase disease risk. There were limited studies on the participation of women in environmental protection, conservation, and management in the Voi sub-County, Taita Taveta County. This led to this study's objective; to examine the participation of women in environmental protection, conservation, and management in the Voi sub-County, Taita Taveta County.

## **2. Literature Review**

### **2.1 Theoretical Framework**

#### **2.1.1 Ecofeminist Theory**

The term "ecofeminism" was coined by Françoise d'Eaubonne in 1974, and it connects the oppression of marginalized groups, including women, people of colour, and the poor, with the oppression of nature. Ecofeminism views the disenfranchisement and oppression of these groups as intrinsically linked to the degradation of the natural world, both stemming from patriarchal dominance (Helbert, 2021; Ghasemi et al., 2021). Ecofeminist theory recognizes the relationship between women and the environment as foundational to its analysis and practice (Zein & Setiawan, 2017). It highlights how patriarchal and capitalist societies treat both women and nature. The central argument of ecofeminism is that the domination of

women and the degradation of the environment are interconnected consequences of patriarchy and capitalism.

#### **2.1.2 Participation Theory**

Participation theory avers that the involvement of stakeholders in decision-making processes can enhance inclusivity and generate ownership of development processes, which, in turn, leads to more sustainable impacts (Srithong, Suthitakon & Karnjanakit, 2019). Gumede and Nzama (2020) note that the principles of people-centred development, self-reliance, capacity building, equality, and empowerment are fundamental components of participation theory. Lasso and Dahles (2021) contend that the foundation of public participation lies in the principles of free speech, the right to a healthy environment, and a secure livelihood.

### **2.2 Review of Empirical Studies**

In Mexico, Durán-Díaz et al. (2020), indicate that non-timber forest products (NTFPs) are utilized for producing household items like sleeping mats, brushes, baskets, hampers, rope, toys, fences, corrals, furniture, kitchen utensils, and farm tools. Additionally, NTFPs offer a variety of resources to rural indigenous populations, creating employment opportunities and generating income. Furthermore, NTFP use reinforces women's self-esteem and strengthens family and community ties. The findings of a study conducted by Asteria, Brotosusilo and Apriana (2018) showed that women who participate as environmental activists play a vital role in mediating environmental conflicts and raising awareness about environmental management for sustainability in the cities of Jakarta and Kota Tasikmalaya in Indonesia. On the other hand, a study by Mago and Gunwal (2019) established that women are key players in managing natural resources at both family and community levels and are disproportionately impacted by environmental degradation. Furthermore, women have taken on leadership roles in environmental conservation and restoration efforts.

The result of a study by Leone (2019) in Nepal indicates that increased female participation in the Executive Committees of Community (ECC) and Forest User Groups leads to a considerable reduction in the extraction of firewood. This finding implies that the gender composition of collective action institutions plays a significant role in their effectiveness in countries with common property resources. A study by Kings (2017) also highlights that a significant proportion of rural women in South Asia (around 70%) and Africa (over 60%) are engaged in farming. The study predicts that environmental degradation and climate change will lead

to a significant decline in yields of rain-fed crops in certain African countries. Furthermore, households, where women have land ownership rights, have been reported to have higher crop yields and increased food security. With land ownership, women have the right to make decisions on the use of the land, including what crops to plant and how to farm them, and they are better positioned to manage and protect the environment.

Raimi et al. (2019) conducted a study to evaluate the involvement of women in environmental conservation and development in Nigeria. They discovered that with adequate support, the vast and increasing number of women in Africa, specifically Nigeria, have the capability to foster development, accomplish worldwide objectives, and change the future of the continent as well as their future. The research suggested that to establish sustainable development, it is necessary to improve the accessibility and ownership of natural resources for all genders, especially for women, individuals with disabilities, marginalized communities, and minority groups. In Kenya, Sawe (2020) in Nandi County, examined the contribution of women's organizations to environmental conservation. The primary objective of the study was to determine how cultural practices, gender policy, resource mobilization, and socio-economic factors affected environmental conservation. The study's outcomes revealed that environmental conservation is influenced by culture, gender policy, resource mobilization, and socio-economic factors. The study's ultimate conclusion is that socio-economic factors have the most significant impact on environmental conservation when compared to other factors. This implies that the social and economic empowerment of women enables them to play an active role in environmental conservation efforts.

Grillos (2018) conducted a quasi-experimental research study that assessed the involvement of women in environmental decision-making. The intervention under investigation was designed to enhance drought preparedness in northern Kenyan pastoralist communities by empowering women at both the household and community levels. The study's findings showed that, in terms of community-level impacts, there was an increase in women's political consciousness and involvement in formal decision-making processes, although such participation did not lead to significant results. Conversely, at the household level, the intervention had a significant and positive impact on the adoption of measures to prepare for drought.

### 3. Methodology

#### 3.1 Research Design

This study adopted mixed methods sequential explanatory design by integrating descriptive research which is a quantitative research design and phenomenological research design, a qualitative approach.

#### 3.2 Study Area and Target Population

This study was conducted in Voi sub-county, Taita-Taveta County. This study targets women in Voi sub-County, Taita Taveta County.

#### 3.3 Sample and Sampling Techniques

Simple random sampling was adopted in this research to select women in the two wards namely; Mbololo and Ngolia respectively. Proportionate random sampling was adopted to sample the number of women in the villages selected.

Purposive sampling was used to select the twelve (12) villages where the study was conducted.

The study's sample size was calculated using a formula developed by Yamane (1967):

$$n = \frac{N}{1 + N(e)^2}$$

Where N= Population Size (8631)  
 N=Total population of women in Ngolia ward (4,081) and Mbololo ward (4550)  
 N=8631  
 n=Sample Size  
 e= Margin of error (e = 0.05 at a confidence level of 95%).  
 1=Constant value  
 Therefore  $n = \frac{8631}{1 + 8631(0.05)^2}$   
 $n = 399.9 \sim 400$   
 $n = 400$

The sample size was allocated among the 12 villages.

#### 3.4 Research Instruments

Questionnaires, Key Informant Interviews and Focus Group Discussion guides were the data collection instruments in the study. The researcher collected secondary data from library books, publications and articles, refereed journals, and past theses to complement primary data.

### **3.5 Data Collection Procedures**

Data were collected in 2 phases. Phase 1, consisted of the collection of quantitative data, whereby structured questionnaires were administered to respondents. The researcher together with research assistants explained to the respondents in detail any question that was not clear, translated into Dawida (a local language the illiterate respondents understand) or Kiswahili for respondents who do not understand the English language. Phase two consisted of the collection of qualitative data where the participants were purposively selected. In this phase, an interview guide, with key informants and focus group discussions, with participants were used

### **3.6 Validity and Reliability**

A Pilot study was conducted in Wundanyi, sub-County, Taita Taveta County, which had not been selected for the main study. During pilot testing, the instruments were subjected to ten (10) participants who were randomly selected. Content validity was imperative in this study, as it improved the research instruments for the quality data collection procedure. The researcher applied the Cronbach Alpha technique. The Alpha coefficient was above the 0.7 recommended minimum value (Creswell & Creswell, 2017). Thus the instruments had an acceptable internal consistency.

### **3.7 Data Analysis Procedures**

Quantitative data was analyzed by the use of descriptive and inferential statistics using a computer package SPSS

version 27. Findings were summarized in the form of frequencies and percentages. Correlation and regression analysis were used to assess the relationship between the independent and dependent variables. The data was presented in tables, graphs, and charts. The qualitative data obtained from Key Informants and Focus Group Discussions were cleaned, coded, transcribed, and categorized into themes for analysis.

## **4. Results and Discussion**

The study sought to answer the research question; What is the extent of women's participation in environmental protection, conservation, and management in Voi sub-County, Taita Taveta County? The study obtained data from 400 women using a questionnaire, 14 key informants and 4 focus groups. The researcher obtained 369 complete questionnaires making a response rate of 92.3%. The researcher successfully interviewed 12 key informants and held four (4) successful group discussions. Two of the group discussions (8 members each) were from Mbololo ward and the other two (8 members each) were from Ngolia Ward.

### **4.1 Participation of women in environmental protection, conservation, and management**

The respondents were requested to indicate their levels of agreement or disagreement on statements that relate to the participation of women in environmental protection, conservation, and management in Voi sub-County, Taita Taveta County.

**Table 1: Participation of women in environmental protection, conservation and management initiatives**

St. N o	Statement	SD		D		N		A		SA		Total
		f	%	f	%	F	%	f	%	f	%	
1	Received technical training	15	4.1	205	55.6	72	19.5	67	18.2	10	2.7	369
2	Aware of the deforestation activities	8	2.2	24	6.5	39	10.6	212	57.5	86	23.3	369
3	Participate in environmental conservation initiatives	31	8.4	109	29.5	34	9.2	156	42.3	39	10.6	369
4	Empowered with environmental management skills	68	18.4	138	37.4	69	18.7	81	22	13	3.5	369
5	Maintain family farming land	21	5.7	72	19.5	39	10.6	34	9.2	85	23.0	369
6	Fetch water and firewood	15	4.1	20	5.4	47	12.7	204	55.3	83	22.5	369
7	Frequency of participation in environmental activities	36	9.8	179	48.5	73	19.8	67	18.2	14	3.8	369
8	Women environmental programmes in the community	46	12.5	124	33.6	95	25.7	91	24.7	13	3.5	369

Source: Field data, (2023)

The findings reveal that the majority of the women in Voi sub-County-Ngolia and Mbololo wards 212 (57.5%) agreed that they are aware of the deforestation activities in their environment, 86 (23.3%) strongly agreed, 39 (10.6%) were neutral, 24 (6.5%) disagreed while 8 (2.2%) strongly disagreed. This implies that the respondents are aware of the deforestation activities in their environment. The majority of the respondents 204 (55.3%) also agreed that they fetch water and firewood from natural resources, 83 (22.5%) strongly agreed, 47 (12.7%) were neutral, 20 (5.4%) disagreed and 15 (4.1%) strongly disagreed. This implies that the majority of the women fetch water and firewood from natural resources. The finding corroborates the view by Milupi et al. (2020) that women often play roles as providers of food, firewood and water, all of which depend heavily on natural resources. Most of the respondents 157 (42.5%) agreed that they maintain their family's farming land, 80 (21.7%) strongly agreed, 72 (19.5%) disagreed, 39 (10.6%) were neutral, and 21 (5.7%) strongly agreed. The responses imply that most of the respondents maintain their family's farming land.

Most of the respondents 156 (42.3%) agreed that they participate in environmental conservation initiatives in the community, 109 (29.5%) disagreed, 39 (10.6%) strongly agreed, 34 (9.2%) were neutral, and 31 (8.4%) strongly disagreed. This implies that the respondents were indifferent on participating in environmental conservation initiatives in the community. Most of the respondents 124 (33.6%) disagreed that women have environmental programs in their community, 95 (25.7%) were neutral, 91 (24.7%) agreed, 46 (12.5%) strongly disagreed and 13 (3.5%) strongly agreed. The findings imply that most of the women disagreed with having environmental

programmes in their community. A majority of the respondents 205 (55.6%) disagreed that they have received technical training on environmental protection, conservation, and management, 72 (19.5%) were neutral, 67 (18.2%) agreed, 15 (4.1%) strongly disagreed while 10 (2.7%) strongly agreed. The findings show that the respondents have not received technical training on environmental protection, conservation, and management. Most of the respondents 179 (48.5%) further disagreed that women frequently participated in environmental activities, 73 (19.8%) were undecided, 67 (18.2%) agreed, 36 (9.8%) strongly disagreed and 14 (3.8%) strongly agreed. The findings imply that women do not frequently participate in environmental activities. Most of the respondents 138 (37.4%) disagreed that women in the village have been empowered with environmental management skills through capacity building, 81 (22%) agreed, 69 (18.7%) were undecided, 68 (18.4%) strongly agreed, while 13 (3.5%) strongly agreed. The responses imply that the majority of the women in the village have not been empowered with environmental management skills through capacity building.

The study sought women's participation in environmental conservation initiatives from the key informants and the focus group discussion participants. From the interviews and focused group discussions, women have partially been involved in environmental conservation initiatives in the community. There have been recent developments where the voices of women have the potential of being heard and included in various projects that focus on climate change led by various groups. Some women are involved in environmental issues by setting up tree nurseries and planting trees, Napier grass on terraces,

Nandi grass, and sweet potatoes, to reduce soil erosions. When enquired on how men and women effectively perform their roles on environmental issues, it was revealed by the FGD participants that men and women perform their roles on environmental issues by planting trees.

One of the participants in the focused group discussions stated,

*“People plant fruit trees and trees for timber to conserve the environment. That is the big role people perform. Also, soil conservation, controlling soil erosion, and digging trenches”*  
**(P 02).**

The findings revealed that a majority of the women are not involved in training programs because they do not have knowledge of such training programs and opportunities. When such opportunities occur, a large majority of men are asked to participate in the training initiatives as opposed to the women who are expected to be the ones involved in the implementation of those projects. However, some women participate in some training programmes with limited time.

The study further sought the application of the skills obtained from the training. The findings further indicated that the few women who have received the training have applied the skills they learnt from the training programs. Many of these trained women implement and educate their families on the new skills they learnt. For example, some welfare groups involve women in the villages and

educate them on their rights and how the law protects women. This way, some of the women are able to express their needs without fear of being ostracised.

The findings are affirmed by the views of one of the participants, who stated,

*“Yes, to some extent, they have been, applying the skills that they are taught in these trainings. But unfortunately, because of adverse weather conditions and changes in weather patterns, these skills have not been fully utilised”*  
**(KI 11).**

The interviews also show that most of the women groups are made up of 10 women, who, when trained, could implement and educate the other women who were not part of the training. Some of the women have been trained on water reuse, the adoption of green cooking energies like energy-saving *jikos*, and how to use briquettes to minimise the use of firewood. However, only a few women have received such training.

## **4.2 Environmental Conservation Initiatives**

The study enquired about the environmental conservation initiatives in Voi sub-County, Taita Taveta County. The respondents were requested to indicate their levels of agreement on statements that relate to environmental conservation initiatives.

**Table 2: Environmental Conservation Initiatives**

St. No	Statement	SD		D		N		A		SA		Total
		F	%	f	%	f	%	f	%	f	%	
1	Presence of environmental conservation programmes	59	16.0	95	25.77	64	17.3	112	30.4	39	10.6	369
2	Environmental conservation initiatives reduce the effects of deforestation and land degradation	2	0.5	15	4.1	14	3.8	205	55.6	133	36	369
3	Environmental conservation initiatives improve the livelihoods of women	11	3.0	19	5.1	13	3.5	284	49.4	142	38.5	369
4	Low participation of women in environmental conservation discourages environmental conservation initiatives	4	1.1	32	8.7	20	5.4	203	55.0	110	29.8	369
5	Under-participation of women in environmental management decision-making reduces the success of the environmental conservation initiatives	2	0.5	21	5.7	27	7.3	204	55.3	115	31.2	369

Source: Field data, (2023)

The findings show that over half of the respondents, 205(55.6%) agreed that environmental conservation initiatives reduce the effects of deforestation and land degradation, 133 (36%) strongly agreed, 15 (4.1%) (disagreed, 14 (3.8%) were neutral while 2 (0.5%) strongly disagreed. The findings imply that environmental conservation initiatives reduce the effects of deforestation and land degradation. Almost half of the respondents 284 (49.4%) agreed that environmental conservation initiatives improve the livelihoods of women 142 (38.5%) strongly agreed, 13 (3.5%) were neutral, 19 (5.1%) disagreed and only 11 (3%) strongly disagreed. Thus environmental conservation initiatives improve the livelihoods of women.

Of the respondents, 204 (55.3%) agreed that under-participation of women in environmental management decision-making reduces the success of environmental conservation initiatives, 115 (31.2%) strongly agreed, 27 (7.3%) were neutral, 21 (5.7%) disagreed while 2 (0.5%) strongly disagreed implying that under-participation of women in environmental management decision-making reduces the success of environmental conservation initiatives. The majority of the respondents 203(55%) agreed that low participation of women in environmental conservation discourages environmental conservation initiatives, 110 (29.8%) strongly agreed, 32 (8.7%) disagreed, 20 (5.4%) were neutral and 4(1.1%) strongly disagreed. The findings imply that the low participation of women in environmental conservation discourages environmental conservation initiatives. The findings imply that much would be achieved if women were

actively involved in environmental conservation which concurs with the findings by Asteria et al. (2018) showed that women who become environmental activists play a crucial role in mediating environmental conflicts and raising awareness about sustainable environmental management. The results show that 112 (30.4%) of the women agreed that there are several environmental conservation programmes in the community, 95(25.7%) disagreed, 64 (17.3%) were neutral, 59 (16%) strongly disagreed while 39 (10.6%) strongly agreed. The findings imply that agreed that there are limited environmental conservation programmes in the community. This implies most of the women had not encountered environmental conservation programmes an indication that they were few if any.

The study sought to assess the presence of women's environmental programmes in the community. The study findings showed a lack of knowledge of such environmental programs.

One of the key informants had this to say, -

*‘‘I cannot say they are specific per se, because these programmes target the entire populace of this location. But women are at the forefront because women realise that when things are not working, they are the ones who suffer the most’’ (KI 09).*

However, it was noted that some NGOs fund a few environmental programmes in Taita Taveta Communities.



In addition, some organizations such as the Food and Agriculture Organization of the United Nations, and ICPAC, FLOCAL, TWENDE are trying to bring women on board by forming small groups among the women. For instance, the FAO has more than 20 women's groups where they teach women how to incorporate modern farming techniques and at the same time how to conserve the environment and how to do smart farming. In support of the findings, Mago and Gunwal (2019) recognized the importance of women's involvement and asserted that planning and training programmes for promoting environmental protection, conservation, and management

must involve women in order to effectively conserve natural resources and protect the environment.

### 4.3 Correlation Analysis

The relationship between the study variables was evaluated by the use of Pearson product-moment correlation. This was important so as to assess the strength of the related variables to draw the right conclusions about variables which can be used to predict the future. The results of the correlation are presented in Table 3.

**Table 3: Beta Correlations**

		Environmental conservation initiatives	Participation
Environmental conservation initiatives	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	369	
Participation	Pearson Correlation	.451**	1
	Sig. (2-tailed)	.004	
	N	369	369

From the correlation analysis, there was a moderate positive correlation between women's participation in environmental protection, conservation, and management and the environmental conservation initiatives ( $r=0.451$ ) which was significant since  $P=0.04$  was less than  $0.05$ . Thus, the study concludes that there was a moderate positive significant correlation between women's participation in environmental protection, conservation, and management and environmental conservation initiatives. This means that if women's participation in environmental protection, conservation, and management is enhanced then the environmental conservation

initiatives would be heightened. In a study by James et al. (2021) on natural resource management and conservation, there is a correlation between women's involvement and favourable environmental conservation results.

### 4.4 Regression Analysis

The study utilized regression analysis as a method to evaluate the connection between the independent and dependent variables.

**Table 2: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.901 <sup>a</sup>	.812	.786	.21162

a. Predictors: (Constant), women participation in environmental management

The correlation coefficient (R) showed a positive relationship between women's participation in environmental protection, conservation, and management and environmental conservation initiatives, with an R value of 0.901. The coefficient of determination (R-squared) is the percentage of variance in the dependent

variable that is explained by the independent variable. The model had an R-squared value of 0.812, which means that 81.2% of the variation in environmental conservation initiatives was explained by women's participation in environmental protection, conservation, and management.

**Table 3: ANOVA**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12.374	1	12.374	49.394	.000 <sup>b</sup>
	Residual	91.939	367	0.251		
	Total	104.313	368			

a. Dependent Variable: environmental conservation initiatives

b. Predictors: (Constant), women participation environmental management

The ANOVA analysis showed that the regression model was highly significant (p-value = 0.000%), indicating that it was appropriate to draw conclusions about the population parameters from the data. The calculated value (49.394) was also greater than the critical value (3.8669),

suggesting that women's participation in environmental protection, conservation, and management had a substantial impact on environmental conservation initiatives. Moreover, the significance value being less than 0.05 confirmed that the model was significant.

**Table 4: Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	1.861	0.472		3.943	0.012
Women participation in environmental management	0.784	0.187	0.762	4.192	000

a. Dependent Variable: environmental conservation initiatives

According to the established regression equation, taking women's participation in environmental protection constant at zero, the environmental conservation initiatives will be 1.861. The data findings analyzed also show that a unit increase in women's participation in environmental protection will lead to a  $\beta=0.784$  increase in environmental conservation initiatives.

## 5. Conclusion and Recommendations

### 5.1 Conclusion

The study concludes that only a small proportion of the women have been involved in environmental conservation initiatives in the community since the initiatives are unavailable. The few that have been involved have been through setting up nurseries, planting trees, napier grass on terraces, nandi grass, and sweet potatoes to reduce erosions. Women in the village have not been empowered with environmental management skills through capacity building. Most women are not involved in training programs but the few who have received the training have applied the skills they learn from the training programs. The training includes establishing tree nurseries, water reuse and adoption of green cooking energies. In the recent past, NGOs and international organizations have made efforts to empower women through women's groups.

### 5.2 Recommendations

1. There is a need to create awareness among women to educate them. The awareness should include the need and importance of environmental perseverance, conservation and management. They should be educated on ways to conserve the environment and be mobilised to plant more trees.
2. The study recommends that NGOs and organizations that train on climate change should ensure that they include a large portion of women. Involving women in such training is advantageous in that women can be able to tell their stories and their own experiences which will pass on skills and experiences to other women. Women should be trained in climate-smart agriculture.
3. The participation of women in environmental conservation and management requires funding. The county government should set aside a kit for women groups to ensure that the women are trained and can implement the skills they have been trained on.
4. There is a need for collaborative management of the environment and should be based on a shared vision among collaborators as they develop a shared understanding of the need to conserve forests.

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